

## Variance Analysis and Business Combinations

### Overview of Variance Analysis

Variance analysis is the process of comparing actual results to budgeted results to identify deviations, understand their causes, and take corrective actions. It is a critical tool for performance evaluation and cost control in budgeting systems.

- **Definition:** The comparison of actual financial and operational results for a period against the budgeted (standard) results.
- **Purpose:** Identifies inefficiencies, cost overruns, or revenue shortfalls, enabling management to improve operations and align with strategic goals.

### Standard Costs

- **Definition:** Predetermined cost estimates for producing a unit, based on expected resource usage and prices.
- **Purpose:** Serves as a benchmark for measuring actual performance in production processes.
- **Role in Flexible Budgeting:** Standard costs are integral to flexible budgets, which adjust variable costs based on actual activity levels while keeping fixed costs constant within a relevant range.
- **Review Process:** Standard costs must be periodically reviewed to ensure accuracy, accounting for changes in material prices, labor rates, or production processes.
- **Sources:** Developed through **activity analysis**, which involves studying tasks, resource requirements, and historical data to set realistic standards.

### Levels of Variance Analysis

Variance analysis is conducted at multiple levels to provide detailed insights into performance deviations.

#### Static Budget Variances (Level 1)

- **Definition:** Compares actual results to the static (master) budget, which is based on a single planned activity level.
- **Limitations:** Does not segregate variances caused by differences in sales volume from those due to cost inefficiencies.
- **Example (Level 1 Variance Report):**

| Item       | Actual Results | Static Budget | Variance (Actual - Static) |
|------------|----------------|---------------|----------------------------|
| Units Sold | 20,000         | 24,000        | 4,000 U                    |

| Item                                                                                                                                                                              | Actual Results | Static Budget  | Variance (Actual - Static) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------------------|
| Revenues                                                                                                                                                                          | \$2,500,000    | \$2,880,000    | \$380,000 U                |
| Variable Costs:                                                                                                                                                                   |                |                |                            |
| Direct Materials                                                                                                                                                                  | \$396,000      | \$384,000      | \$12,000 U                 |
| Direct Manufacturing Labor                                                                                                                                                        | \$261,000      | \$288,000      | \$27,000 F                 |
| Variable Manufacturing OH                                                                                                                                                         | Included above | Included above | Included above             |
| Total Variable Costs                                                                                                                                                              | \$599,800      | \$768,000      | \$168,200 F                |
| Contribution Margin                                                                                                                                                               | Not provided   | Not provided   | Not provided               |
| Fixed Costs                                                                                                                                                                       | \$570,000      | \$552,000      | \$18,000 U                 |
| Operating Income                                                                                                                                                                  | Not provided   | \$216,000      | Not provided               |
| o <b>Notes:</b>                                                                                                                                                                   |                |                |                            |
| ▪ "U" = Unfavorable (actual worse than budgeted).                                                                                                                                 |                |                |                            |
| ▪ "F" = Favorable (actual better than budgeted).                                                                                                                                  |                |                |                            |
| ▪ The variance report shows a significant favorable total variable cost variance (\$168,200 F), but the unfavorable sales volume (4,000 units) distorts cost efficiency analysis. |                |                |                            |

### Level 2 Variances

- **Definition:** Breaks down static budget variances into sub-variances:
  1. **Sales Volume Variance:** Due to differences in actual vs. budgeted sales volume.
  2. **Flexible Budget Variance:** Due to differences in costs or revenues at the actual activity level.
- **Purpose:** Isolates the impact of sales volume from cost inefficiencies, providing clearer insights into operational performance.

### Level 3 Variances (Manufacturing Input Variances)

- **Definition:** Focuses on inputs to the manufacturing process, subdividing variances into specific components.
- **Types:**

#### 1. Direct Materials Variances:

- **Total Material Variance:** Difference between actual and standard material costs.
- **Price Variance:**  $(AP - SP) \times AQ$ 
  - AP = Actual Price, SP = Standard Price, AQ = Actual Quantity.
- **Quantity (Efficiency) Variance:**  $(AQ - SQ) \times SP$ 
  - SQ = Standard Quantity for actual output.
- **Mix Variance:**  $(WASP_{AM} - WASP_{SM}) \times AQ$ 
  - WASP = Weighted Average Standard Price (Actual Mix vs. Standard Mix).
- **Yield Variance:**  $(AQ - SQ) \times WASP_{SM}$ .

#### 2. Direct Labor Variances:

- **Rate Variance:**  $(AR - SR) \times AH$ 
  - AR = Actual Rate, SR = Standard Rate, AH = Actual Hours.
- **Efficiency Variance:**  $(AH - SH) \times SR$ 
  - SH = Standard Hours for actual output.

#### 3. Factory Overhead Variances:

- **Total Overhead Variance:** Actual vs. budgeted overhead costs.
- **Fixed Overhead Variances:**
  - **Spending (Budget) Variance:** Actual fixed overhead vs. budgeted fixed overhead.
  - **Production Volume Variance:** Budgeted fixed overhead vs. applied fixed overhead (based on standard hours).
- **Variable Overhead Variances:**
  - **Spending Variance:** Actual variable overhead vs. budgeted variable overhead for actual hours.
  - **Efficiency Variance:** Budgeted variable overhead for actual hours vs. applied variable overhead.

#### 4. Sales Variances:

- **Total Sales Variance:** Actual vs. budgeted revenue.
- **Price Variance:** Difference due to actual vs. standard selling price.

- **Volume Variance:** Difference due to actual vs. budgeted sales volume.
- **Mix Variance:** Impact of selling different proportions of products.
- **Quantity Variance:** Impact of overall sales volume changes.

#### Variance Formulas

| Variance Type     | Formula                             |
|-------------------|-------------------------------------|
| Material Price    | $(AP - SP) \times AQ$               |
| Material Quantity | $(AQ - SQ) \times SP$               |
| Material Mix      | $(WASP_{AM} - WASP_{SM}) \times AQ$ |
| Material Yield    | $(AQ - SQ) \times WASP_{SM}$        |
| Labor Rate        | $(AR - SR) \times AH$               |
| Labor Efficiency  | $(AH - SH) \times SR$               |

**Variable OH Spending** Actual variable OH -  $(AH \times \text{Standard Rate})$

**Variable OH Efficiency**  $(AH - SH) \times \text{Standard Variable OH Rate}$

**Fixed OH Spending** Actual fixed OH - Budgeted fixed OH

**Fixed OH Volume** Budgeted fixed OH - Applied fixed OH

#### • Abbreviations:

- AQ: Actual Quantity
- SQ: Standard Quantity
- AP: Actual Price
- SP: Standard Price
- AH: Actual Hours
- SH: Standard Hours
- AR: Actual Rate
- SR: Standard Rate
- $WASP_{AM}$ : Weighted Average Standard Price (Actual Mix)
- $WASP_{SM}$ : Weighted Average Standard Price (Standard Mix)

#### Favorable vs. Unfavorable Variances

#### • Income Items (Revenues):

- Favorable: Actual revenue > Budgeted revenue.
- Unfavorable: Actual revenue < Budgeted revenue.
- **Cost Items:**
  - Favorable: Actual cost < Budgeted cost.
  - Unfavorable: Actual cost > Budgeted cost.
- **Order of Subtraction:** Always subtract standard from actual (Actual - Standard).

#### Additional Insights

- **Activity Analysis:** Standards are set by analyzing tasks, resource requirements, and historical data, ensuring realistic benchmarks.
- **Flexible Budgeting:** Enhances variance analysis by adjusting variable costs to actual activity levels, isolating efficiency and price variances.
- **Control Loop:** Variances trigger corrective actions (e.g., renegotiating supplier prices for unfavorable material price variances).
- **Strategic Alignment:** Variance analysis supports strategic goals by identifying cost-saving opportunities and operational inefficiencies.

#### Business Combinations and Consolidations: Example Problem

##### Problem

**Scenario:** On January 1, 2025, Parent Co. acquires 100% of Sub Co. for \$20,000,000 in cash to expand into the electronics manufacturing market. Sub Co.'s net assets have a fair value of \$16,000,000, including a patent valued at \$3,000,000 with a 10-year useful life. Sub Co. uses **standard costs** and a **flexible budget** for cost control. For 2025, Sub Co.'s master budget projects 50,000 units with standard costs: direct materials (\$10/unit), direct labor (\$15/unit), variable overhead (\$5/unit), and fixed overhead (\$500,000). Actual results: 52,000 units produced, direct materials (\$550,000), direct labor (\$800,000), variable overhead (\$270,000), fixed overhead (\$510,000). Calculate goodwill, prepare the consolidation journal entry under US GAAP, compute material and labor variances, and discuss how variance analysis supports post-acquisition performance evaluation.

##### Solution:

1. **Goodwill Calculation:**
  - Purchase price: \$20,000,000
  - Fair value of net assets: \$16,000,000
  - Goodwill = \$20,000,000 - \$16,000,000 = **\$4,000,000**
2. **Consolidation Journal Entry (US GAAP):**
3. Dr Assets (excluding patent) 13,000,000

4. Dr Patent 3,000,000
5. Dr Goodwill 4,000,000
6. Cr Cash 20,000,000

#### 7. Amortization of Patent (Year 1, US GAAP):

- Annual amortization = \$3,000,000 ÷ 10 years = \$300,000
- 8. Dr Amortization Expense 300,000
- 9. Cr Accumulated Amortization 300,000

#### 10. Variance Analysis:

##### ○ Direct Materials Variances:

- **Standard Costs:** \$10/unit × 52,000 units = \$520,000
- **Actual Costs:** \$550,000
- **Total Material Variance:** \$550,000 - \$520,000 = \$30,000 U
- Assume actual quantity (AQ) = 55,000 units of material, actual price (AP) = \$10/unit (for simplicity, as quantities not provided):
  - **Price Variance:**  $(AP - SP) \times AQ = (10 - 10) \times 55,000 = \$0$
  - **Quantity Variance:**  $(AQ - SQ) \times SP = (55,000 - 52,000) \times 10 = \$30,000 \text{ U}$

##### ○ Direct Labor Variances:

- **Standard Costs:** \$15/unit × 52,000 units = \$780,000
- **Actual Costs:** \$800,000
- **Total Labor Variance:** \$800,000 - \$780,000 = \$20,000 U
- Assume actual hours (AH) = 40,000, standard hours (SH) = 39,000, actual rate (AR) = \$20/hour, standard rate (SR) = \$20/hour:
  - **Rate Variance:**  $(AR - SR) \times AH = (20 - 20) \times 40,000 = \$0$
  - **Efficiency Variance:**  $(AH - SH) \times SR = (40,000 - 39,000) \times 20 = \$20,000 \text{ U}$

#### 11. Strategic and Variance Analysis Notes:

- **Variance Analysis:** The \$30,000 unfavorable material quantity variance suggests overuse of materials, and the \$20,000 unfavorable labor efficiency

variance indicates inefficient labor usage. These insights guide corrective actions (e.g., process improvements, training).

- **Flexible Budget:** Adjusts standard costs to 52,000 units, providing a relevant benchmark for variance analysis, isolating efficiency issues from volume changes.
- **Post-Acquisition Performance Evaluation:** Variance analysis supports **control** by identifying inefficiencies in Sub Co.'s production, ensuring alignment with Parent Co.'s cost management goals. It informs the **master budget** by refining future cost estimates.
- **Consolidation:** Eliminate Sub Co.'s equity accounts. Goodwill is tested annually for impairment, and the patent is amortized under US GAAP.
- **Strategic Alignment:** Variance analysis ensures Sub Co.'s operations are cost-efficient, supporting Parent Co.'s strategic objective of profitable expansion in the electronics market.